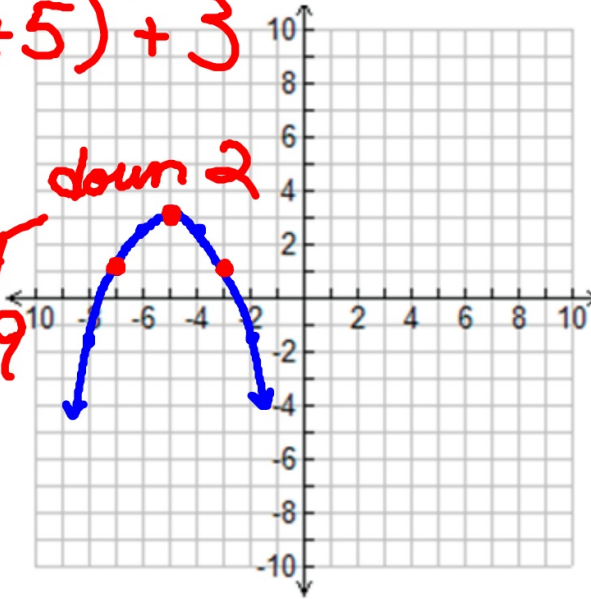


Bellwork: 11/13/12

Find the equation of the quadratic function graphed below:

$$y = -\frac{1}{2}(x+5)^2 + 3$$

over 1 up 1
over 2 up 4
over 3 up 9
down 2



Section 4.2 - Standard (General) Form of a Quadratic

Standard Form: $y = ax^2 + bx + c$

to find x value of vertex (h):

Vertex:
(x,y)
(h,k)

$$-\frac{b}{2a}$$

to find y value of vertex (k):

take answer for x value and plug into
expression

$$ax^2+bx+c$$

$$a(x-h)^2+k$$

Converting from Standard (General) Form to Vertex form:

example 1: $y = x^2 + 2x + 3$
 $a=1 \quad b=2 \quad c=3$

Find the vertex:

<u>x value (h):</u>	}	<u>y value (k):</u>
$\frac{-b}{2a} = \frac{-2}{2(1)} = \frac{-2}{2} = -1$		$(-1)^2 + 2(-1) + 3$
		$1 - 2 + 3 = 2$ $-1 + 3$

Use the vertex and the given "a" value to put in vertex form:

Vertex = $(-1, 2)$
 $a=1$

$$y = 1(x+1)^2 + 2$$

or

$$y = (x+1)^2 + 2$$

Convert each of the following into vertex form. Then graph.

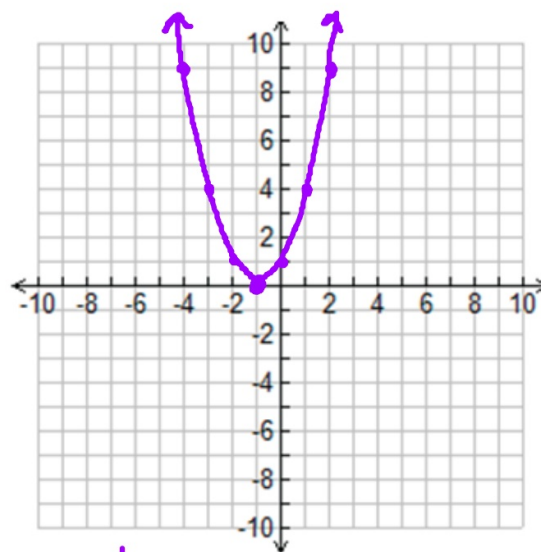
example 2: $y = x^2 + 2x + 1$
 $a=1 \quad b=2 \quad c=1$

vertex:

<u>x value</u>	}	<u>y value</u>
$\frac{-b}{2a} = \frac{-2}{2(1)} = \frac{-2}{2}$		$(-1)^2 + 2(-1) + 1$
-1		$1 - 2 + 1$ $-1 + 1$ 0

Vertex form: $y = (x+1)^2$
 $(-1, 0)$
 $a=1$

over 1 up 1
over 2 up 4
over 3 up 9



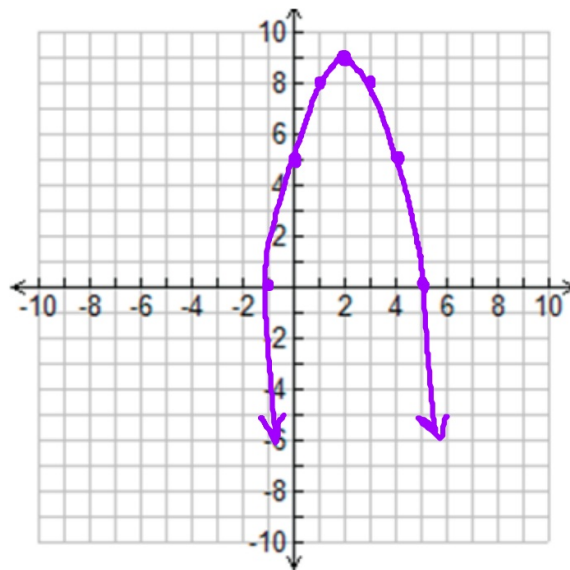
example 3: $y = -x^2 + 4x + 5$
 $a = -1$ $b = 4$ $c = 5$

vertex:
x value $\left\{ \begin{array}{l} \text{y value:} \\ -1(2)^2 + 4(2) + 5 \\ -4 + 8 + 5 \\ 4 + 5 \\ 9 \end{array} \right.$
 $-\frac{b}{2a} = \frac{-4}{2(-1)} =$
 $= \frac{-4}{-2} = 2$

vertex: $(2, 9)$

$a = -1$

$$\boxed{\begin{array}{l} y = -1(x-2)^2 + 9 \\ \text{or} \\ y = -(x-2)^2 + 9 \end{array}}$$



example 4: $y = 2x^2 - 8x + 3$
 $a = 2$ $b = -8$ $c = 3$

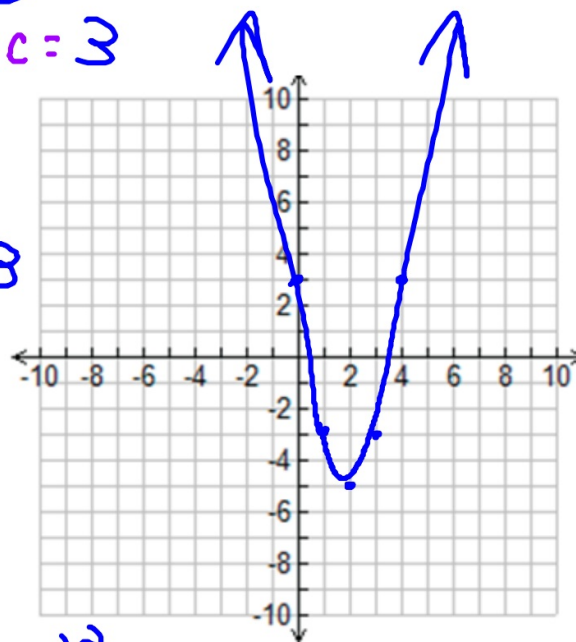
vertex:
x value: $\left\{ \begin{array}{l} \text{y value:} \\ 2(2)^2 - 8(2) + 3 \\ 8 - 16 + 3 \\ -5 \end{array} \right.$
 $-\frac{b}{2a} = \frac{8}{2(2)} =$
 $\frac{8}{4} = 2$

vertex form:

$(2, -5)$

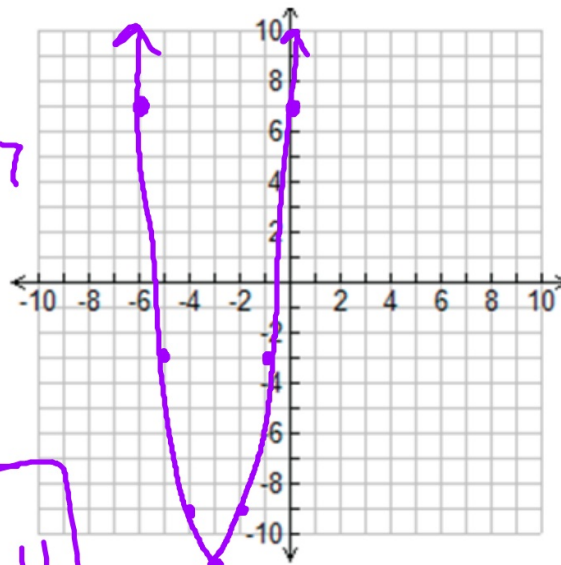
$a = 2$

$y = 2(x-2)^2 - 5$



example 5: $y = 2x^2 + 12x + 7$
 $a = 2 \quad b = 12 \quad c = 7$

Vertex:
xvalue: $-\frac{b}{2a} = -\frac{12}{2(2)} = -\frac{12}{4} = -3$
yvalue: $2(-3)^2 + 12(-3) + 7$
 $18 - 36 + 7$
 $-18 + 7$
 -11



Vertex form:

$(-3, -11)$

$a = 2$

$y = 2(x+3)^2 - 11$

Homework:

1 - 8 \rightarrow vertex form

9 - 14 \rightarrow general form